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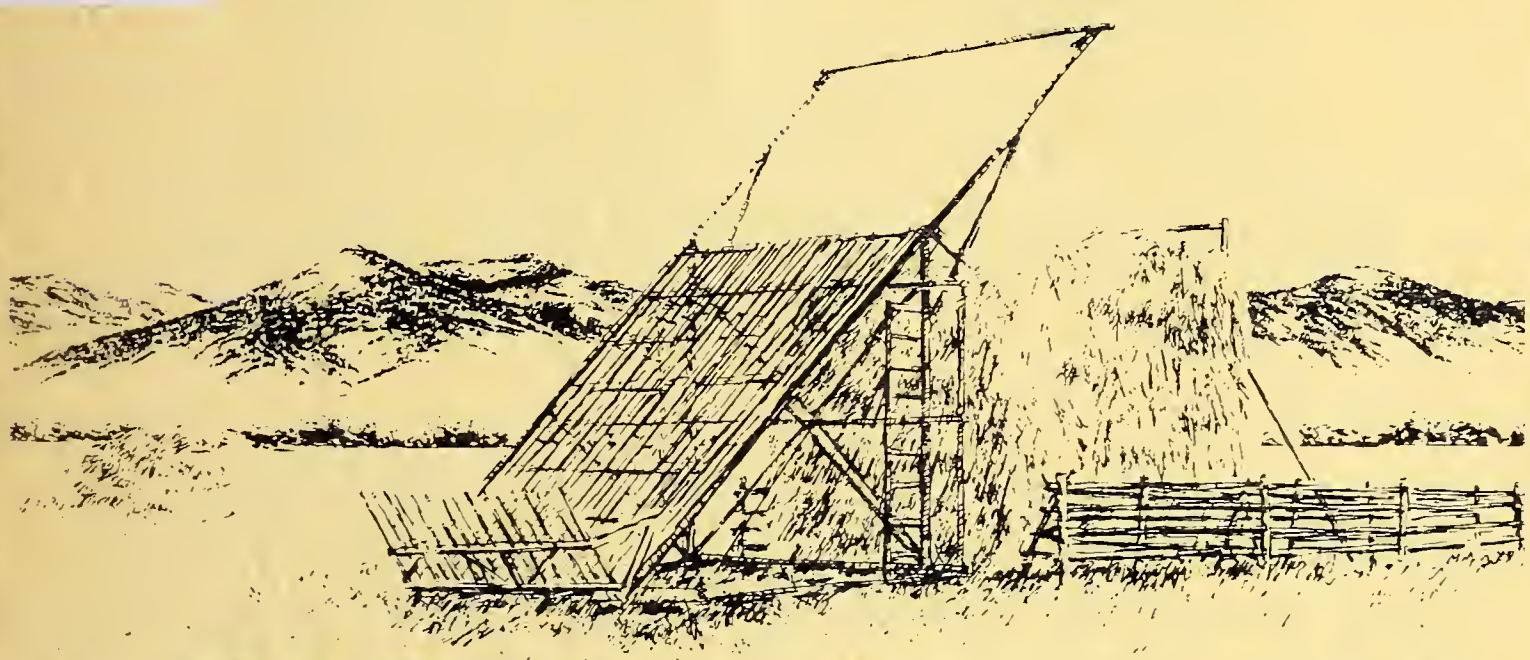

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Water Storage in the BIG HOLE:

A Recommendation

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WATER STORAGE IN THE BIG HOLE: A RECOMMENDATION

Water problems in the Big Hole basin have troubled irrigators and fishermen since the turn of the century. There just isn't enough water to satisfy the needs for it. Irrigators in the upper basin suffer water shortages annually, development of irrigable lands in both the lower and upper basins is halted by insufficient quantities of water, and dewatering threatens the quality of fish habitat in the blue-ribbon reach of the Big Hole River.

Determined to address those problems, the Montana State Legislature passed HB 824 in 1979, directing the Montana Department of Natural Resources and Conservation to conduct a water demand survey in the Big Hole and Jefferson basins and to study tributary storage sites that have potential to provide water in sufficient amounts to relieve the shortages. The report prepared by DNRC in response to HB 824 will be presented to the Forty-seventh Legislature; it is summarized in this brochure.

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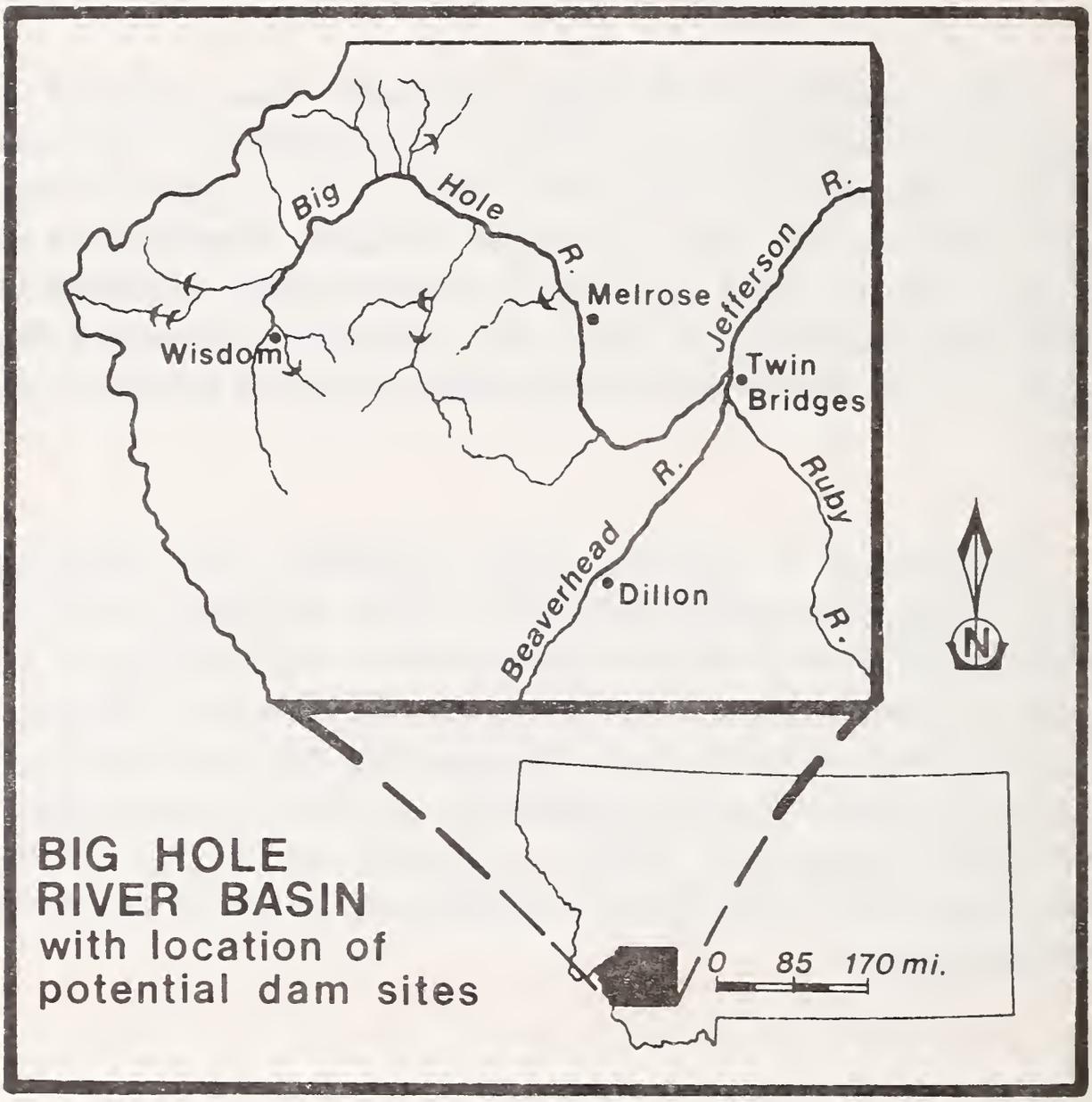


BIG HOLE RIVER BASIN
with location of potential dam sites

Recommendation

DNRC recommends construction of a dam on Pattengail Creek, a tributary of Wise River, which would provide water for instream needs, irrigation, and flood control. Construction would cost approximately $3.5 million; about 10,000 acre-feet of water would be available annually at a cost of $36/acre-foot. The costs could be shared among those who use the water for such purposes as agriculture, instream use, and flood control. The first step toward building the dam is to obtain funding for detailed engineering and financial feasibility work. Two likely sources for this funding are the Water and Power Resources Service and the Soil Conservation Service. If the proposed Water Development Program were passed by this legislature, DNRC could provide manpower for coordinating feasibility and preliminary engineering plans with these federal agencies, and help to implement the plans.

Water Demands in the Big Hole Basin

Irrigators in the upper basin suffer water shortages most years in July and August when snowpack runoff has disappeared from the tributary streams—leaving them dry, in many cases. In a typical year, upper basin irrigators receive only 30 percent of the water they need after July 15. In the lower basin, where the river has been classified as a blue-ribbon trout stream, irrigators can obtain sufficient water from the mainstem river to satisfy needs for currently irrigated lands, but there is too little water in late summer and fall to support a true blue-ribbon fishery. Also, there isn't enough water in the lower basin to irrigate additional irrigable lands. At present, municipal uses are minimal and neither affect nor are affected by water shortages.

A total of 133,854 acres are now irrigated in the upper and lower basins. A total of 85,445 additional acres is potentially irrigable, of which 45,405 acres would be economically feasible to irrigate if there were enough water to do so. There isn't.

There are no reported shortages for irrigation purposes in the Jefferson River basin from Twin Bridges to Whitehall.

In the Big Hole basin the current annual irrigation diversion requirement is estimated to be 381,888 acre-feet. A transbasin diversion to the Beaverhead River basin is estimated at 24,787 acre-feet annually. The instream flow requirement, determined by the Montana Department of Fish, Wildlife, and Parks to maintain a high-quality fish habitat, is 684,998 acre-feet per year. Municipal use, combining Jackson, Wisdom, Wise River, Divide, and Melrose with Butte Water Company, the major user, is currently 24,018 acre-feet per year. The total of all current uses is about 1,115,000 acre-feet per year, and the total annual average river discharge is about 1,130,000 acre-feet per year—more than enough to satisfy current uses. The difficulty is that the water is not available where or when it is needed. Both instream and irrigation shortages occur between mid-July and September.

Potential Solutions to Water Shortage Problems

Potential solutions to these shortages include mainstem storage at the Reichle site downstream from Glen, ground-water development, water conservation, water rental to alleviate instream shortages, and tributary storage.

The mainstem Reichle site, proposed as a possible panacea for the problem, would give a poor return on the investment, has been opposed by sportsman groups, and would not make water available to the upper basin where most of the irrigation shortages exist. It would also flood parts of the blue-ribbon stretch. Construction of a dam at this site is not recommended.

Ground-water development—using water wells to provide irrigation water—could improve the shallow ground-water conditions that reduce crop productivity, make water available throughout the growing season, and relieve the annual water shortages in the upper basin. However, no one knows how much ground water the basin can yield. Also, there isn't enough electric power in the area to supply pumping requirements, and expansion of the power distribution system would be costly. Even when electricity is available, costs for supplying ground water for irrigation are prohibitive—$55/acre-foot.

For these reasons, ground-water development would not solve water shortage problems in the basin.

The continuous flood irrigation practiced in the upper basin is inefficient, but it is cost effective. It does not contribute to water shortages because the ground-water system is saturated so that most of the excess water applied to the land

returns, rather quickly, overland to the water source. Therefore, conservation of water through more efficient irrigation practices in the upper basin would not relieve instream flow shortages or make significant amounts of additional water available for irrigation.

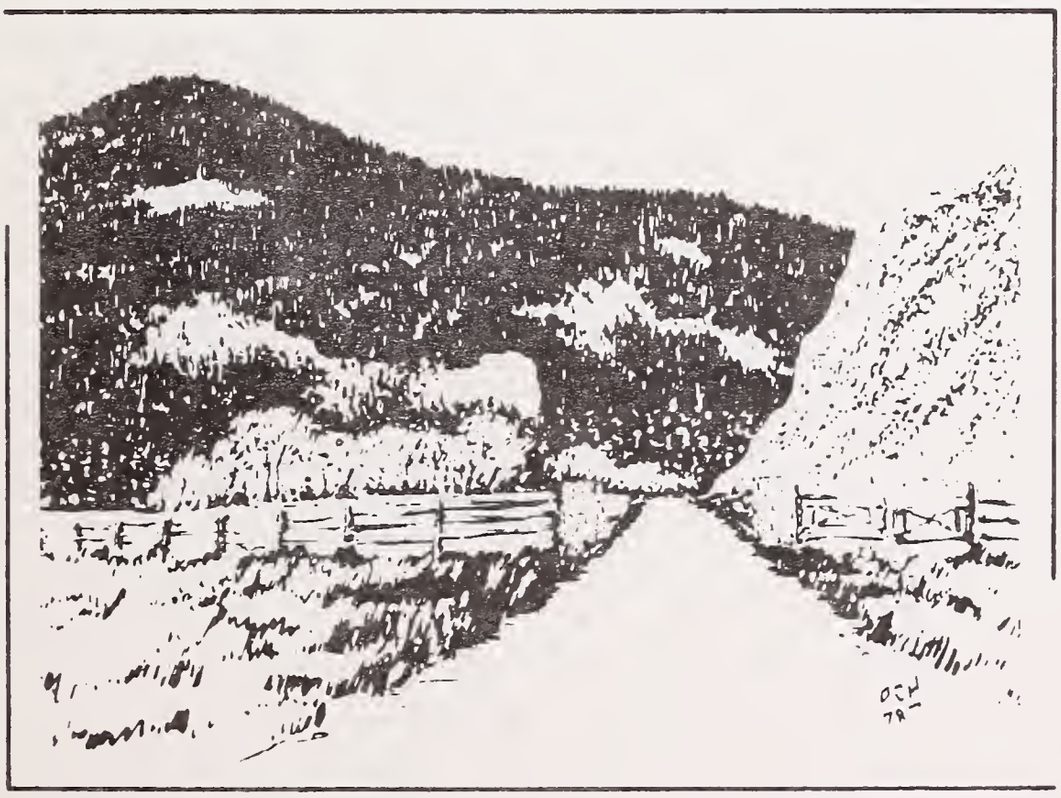
It would be possible, if some laws were changed, to rent water from irrigators to augment instream flows, renting the water only when needed at a price negotiated with a current user who was willing to agree to such an arrangement. This solution is untested, could be administratively complicated, and may not provide water any less expensively than would tributary storage. And, because it would not aid irrigators, DNRC does not recommend this approach in the Big Hole.

Tributary storage is the most feasible solution to water shortage problems in this basin. DNRC studied twenty-two reservoir storage sites that had been picked from an original 120 potential sites, and further screened the twenty-two down to a final eight. A total reservoir storage of 173,000 acre-feet could be provided if all eight sites were constructed. Storage of more than 575,000 acre-feet of water would be needed to satisfy all diversion requirements and instream needs. However, construction of a single reservoir could reduce the shortages significantly.

The eight sites studied are on Francis Creek, Canyon Creek, Trail Creek, Johnson Creek, French Creek, Wise River, and Pattengail Creek. The sites on Francis Creek and Canyon Creek are geologically unsuitable for dam construction. Trail and Johnson creeks are located in the upper basin where there are irrigation shortages but no instream shortages. Because the water from these sites would be too expensive for irrigators alone to afford, the only financially feasible sites are those that serve the lower basin where instream interests can share the costs with agriculture. These sites are those on French Creek, Wise River, and Pattengail Creek. The site on Pattengail Creek is twice as large as that at French Creek (10,000 acre-foot firm annual yield versus 5,000) and the water

is about one-half the cost ($36/acre-foot at Pattengail versus $60/acre-foot at French Creek); so, French Creek has been eliminated. The cost of water at the Pattengail site is approximately the same as at Wise River ($36/acre-foot for Pattengail and $30 for Wise River), but a proposal to build a dam at the Wise River site would cause insurmountable environmental concerns because the reservoir would flood critical moose habitat and because the area has great aesthetic value. Therefore, the Wise River site was dropped.

DNRC recommends that a dam be built at the Pattengail site. Because stored water from a Pattengail reservoir could be released from mid-July to September, the project could improve the dewatering in the Wise River and Big Hole, as well as provide water for irrigation in the Wise River valley, the Lower Big Hole basin, and the Jefferson basin.



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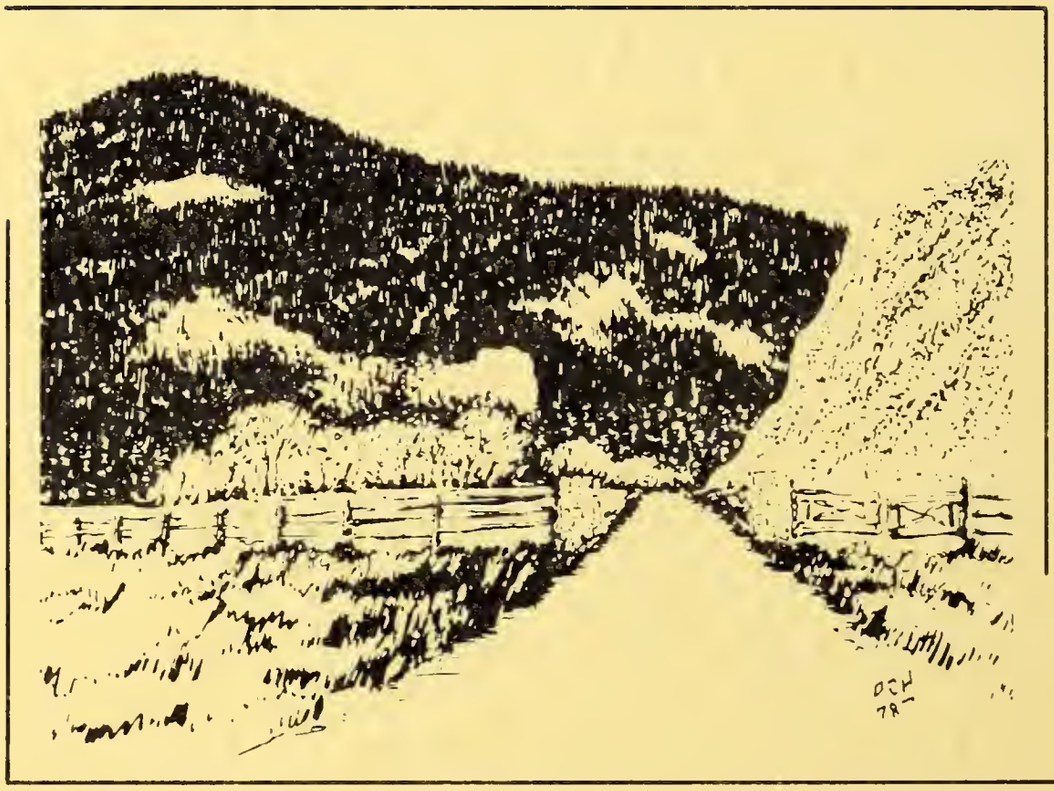

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